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Editorial.

ON PREFERENCES.

WHY, in the various activities of life, do men do things? Is it because, as a rule, they prefer to do them? Is the fount of their action governed by pleasurable inclination or their motive swayed by a happy enthusiasm? If it were universally so and each man got the work he loved a much better result would doubtless be gained in most cases and many more joyful faces and hearts would abound.

If we could each choose the task we liked or the walk in life we preferred our work would in many cases be done better, the line of advance in science, art, and industry would extend further than at present, on the plane of the unknown and unexplored regions. If we all loved the work we were engaged in we should persevere with it and be so sympathetically inclined towards it that it would be veritably impossible to do it badly or indifferently.

In this topsy-turvy world, however, we seldom get a choice of our vocation in life. Most of us are in the hands of precedent and circumstance, and it is with us as with the immortal Hobson "that or none." The lawyer ofttimes wishes he had been a doctor, the priest a soldier, the politician an actor, the bank clerk a sailor or a dentist, and the veterinary surgeon a farmer. They would probably do no better in altered vocations, but each man at some time in his life almost invariably thinks he could. However, we cannot easily change our lot, so we toil on in our special spheres and achieve a certain amount of ability or skill at our appointed work by reason of long practice, by thought and action, or, whisper it softly, occasionally by mechanical action with very little thought. Nevertheless,

the best cannot be attained unless the heart is in the work. No artist or scientist ever advances far or attains great heights unless he loves his task. Who would prefer "the long hours, the mean rewards, the ever-present uncertainty," and the soul-killing monotony of the average industrial worker if he had the chance of being a gentleman of leisure with an assured income, a well-paid singer of the nation's songs, or a renowned architect or engineer. There are many occupations that by their deadening effect on thought and spirit kill initiative. At the present time we think there is a great lack of inspiration and power of acute perception evident on all hands in intellectual fields. The material everywhere takes precedence of the spiritual. The amount of brain power many of us have is not half utilized. Can it ever be fully and usefully employed under present conditions? In many cases perhaps not. Yet the tragedies of life on all sides show us how widespread is the ass-like patience that accepts things as they are and never by thought and action endeavours to change them. We see the same man doing the same mechanical thing year in and year out until he sinks into oblivion often "unwept, unhonoured, and unsung." We ourselves are, at any rate, on a plane high enough for us to sympathize with and try to avoid a similar attitude and outlook towards our work to that of the man whose life is spent in cutting off bars of metal of equal length with a mechanical knife, with the woman who spends her days in hemming blouses at so much a dozen, with the minder who eternally follows the spinning jenny with its ever to-and-fro movement.

The surroundings of a man's calling, the sphere in which he acts, the conditions prevailing in and about his work have consciously or unconsciously to him an effect on his spirit, zeal and power of insight. With us much is in our favour. Almost all day long we have the heaven above us, fresh air (or as good as can be obtained) around us. We see the clouds, the sun, the moon, the stars. We experience the heat and cold, the balmy breezes and the biting blasts (for an unwritten law has decreed that all veterinary surgeons must go to and fro in open vehicles). The man who is nearest to Nature in her varying moods has the best chance of keeping his spirit fresh, his soul alive, and his intellect alert. The conditions are first-rate and there are not many other walks in life that we could prefer

that extraneously would confer more easily acquired or better benefits on us. Most of us make a mere living, nevertheless it is generally a livelihood, with not a few compensations.

Do we take full advantage of all the inspiration we are capable of absorbing? If we did, how great would our advances be. We consider scarcely any other calling would be able to give us points in the progress obtainable.

We sometimes think if all our past literature and history, our printed and written records, were destroyed and irrevocably consigned to oblivion that a great awakening might be evident in our profession. At any rate, the need for the exercise of brain power would be more evident; inquiry, investigation, insight, intuition, intellectual energy and vim, and all the things that tend to keep science and art at a high level and to permit it to advance triumphantly would bear on the present and not be scattered and dissipated on the arid, narcotizing and effort-paralysing fields of the past. "Living problems would be tackled by living minds. There would be no calling on the Dead Hand to help us.".

If instead of "trying to rediscover things that had been already discovered and forgotten ten times over in the centuries of the past" we devoted ourselves to delving, mining, and diving into the things of the present, how much more profitable the occupation might be and how much greater the advance. With all our boasted present-day education and educational methods do we produce the best-finished article, do we put our learning to the most valuable application, do we give it the fullest chance to grow and expand? If we did we should prefer initiative to servile imitation, thought to dumb submission, the exploring of interesting by-ways and untrodden roads to the monotonous journeys over well-travelled ground. Misery, dull, lack lustre existence, soul-destroying monotony would vanish like the morning mist, as far as we were concerned. We should have preferred the better way and by single-heartedly following our own preferences we should attain to greater happiness and subconsciously perchance recognize in ourselves the quality which seeing in the cat we respect and admire, whilst getting rid of the dog-like attribute we all possess, but despise ourselves for possessing. It was not without thought that Old Egypt "made of the cat a god and of the dog a pariah."

Perhaps we have not stuck very close to our text in this editorial, but we prefer to leave it as it is, for "all a writer can do is to sow ideas about broadcast and trust to some of them falling on fertile soil."

G. M.

General Articles.

ON THE TRAINING OF VETERINARY SURGEONS FOR PUBLIC DUTIES WITH REFERENCE TO THE INSTITUTION OF A DIPLOMA IN VETERINARY STATE MEDICINE.*

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It has long been known to medical and veterinary pathologists that the control and prevention of infectious diseases must be based upon an exact knowledge of the etiology of these diseases, of the life history of the causal animal or vegetable parasites, and of the conditions favouring the transmission of disease and the occurrence of epidemics and of epizootics. It is now generally accepted that preventive medicine even in its most administrative aspect is based upon pathology, epidemiology, and epizootiology.

The importance of the diseases of animals that are communicable to man was early recognized by public health administrators; but while the public health service was in its infancy no adequate provision could be made for the administrative control of animal diseases. It, however, soon became obvious that the duties of medical officers of health did not allow them the time necessary to make themselves familiar with all the diseases of animals that are liable to affect man, and that sanitary inspectors from want of previous training could not be entrusted with this part of the work. It was then realized that the co-operation of the veterinary profession was not only desirable, but necessary. This appeared to us in Manchester so clearly indicated, that when in 1892 we were engaged in reorganizing the courses for the Diploma in Public Health, I suggested that provision should also be made for instruction in veterinary preventive medicine. This, in my opinion, was needed not only for the purpose of improving the means available for the prevention of human diseases, but also for the purpose of helping agriculturists in their efforts to reduce the losses due to diseases to which livestock are liable. The knowledge which had already been gained

* Reprinted from *Public Health*, September, 1914, the Journal of the Society of Medical Officers of Health.

regarding the causes of many animal diseases seemed to be sufficiently advanced to justify the establishment of a public veterinary service, somewhat on the lines of the public health service. The necessity of special training had been recognized in the report of the Departmental Committee on Pleuro-Pneumonia and Tuberculosis in 1888 (Part 1, p. xiii, paragraphs 55 and 56).

There were, however, differences of opinion upon the subject, and several of the leading members of the veterinary profession whom I consulted showed themselves adverse to the institution of post-graduate courses such as were contemplated. They urged that the veterinary students who had taken a full course of instruction for the membership of the Royal College of Veterinary Surgeons and obtained the ordinary diploma of the College were competent to undertake any of the duties connected with the public services. But in the course of the subsequent ten years various sanitary authorities realized the importance of having the assistance of specially trained veterinary officers, more specially in connection with meat inspection and the control of bovine tuberculosis. The same need was felt in agricultural circles. After careful inquiries and consultations, the University of Manchester decided to institute a post-graduate course in veterinary hygiene and preventive medicine, and to grant a diploma to members of the Royal College of Veterinary Surgeons who had attended satisfactorily the course prescribed by the University, and passed an examination corresponding in scope to the examination for the Diploma in Public Health. This scheme was realized in 1902.

Considering the fact that there was not at the time outside the Board of Agriculture any regular opening for specially trained veterinary officers except in connection with the Public Health Departments of counties and county boroughs, it was thought expedient to direct the teaching and examination towards those branches of veterinary State medicine that had a special bearing upon the prevention and control of the diseases of animals that are communicable to man. It was realized, however, that when other branches of a State veterinary service were organized certain additions would have to be made to the curriculum, so as to meet special requirements. It was not thought desirable to widen the scope of the course to such an

extent as to make it impossible for the students to obtain a *practical mastery* of the subjects selected for special study.

After careful inquiry, it was ascertained that under the prevailing conditions it would be useless to offer a course of more than nine months' duration (that is, a whole academic year), because there would be extremely few, if any, veterinary graduates who would be willing to incur the loss of time and money, which a course extending over more than one year would involve.

In the selection of subjects of study we were guided by the belief that what the average post-graduate student wanted most was to obtain a practical knowledge of (1) the scientific methods which are constantly needed in the investigation of the causes and phenomena of disease; (2) the practical application of the knowledge gained by these methods to the administrative control of disease.

With regard to students showing special aptitude for research, and desiring to do some special work, it was thought that the best way to meet their case was to offer them opportunities to carry out suitable investigations in the laboratory under the supervision of the staff. But the main object was to give the men attending the University post-graduate course a sound, practical knowledge of scientific and administrative methods which had proved of value or might become useful in the investigation and prevention of disease. This appeared to be the best way to prepare the men for the efficient discharge of the important and responsible duties that might be entrusted to them by public authorities.

In order to carry out this scheme, it was found necessary that post-graduate students should obtain their instruction not only from pathologists, bacteriologists, zoologists, chemists, and other laboratory workers, but also from veterinary officials engaged in administrative work in connection with the inspection of farms, markets, abattoirs, &c. The subjects which appeared most suitable for teaching of a practical character in the laboratory were comparative pathology, with special reference to the causes and mode of spread of disease, the life-history of the most important animal and vegetable parasites, the influence of various factors upon the occurrence and distribution of disease, and other subjects generally included in epidemiology or

epizootiology. It was also thought desirable to give a place in the curriculum to practical chemistry, more specially with reference to the analysis of water, air, soil, and various dairy produce and foodstuffs, not with the object of making the students competent analytical chemists, but rather for the purpose of making them familiar with the meaning of analytical results, and also in order to complete a part of their scientific training, which is often neglected at an early stage.

The scope of the instruction which it has been found possible to impart with some success during the last twelve years is indicated in a general way in the regulations of the University of Manchester as regards the subjects of the examination for the Diploma in Veterinary State Medicine. (The examination lasts four days, three of which are devoted to practical work and oral examinations.)

(1) Practical chemistry, with special reference to veterinary hygiene. (*a*) Methods of qualitative and quantitative analysis, with special reference to the examination of air, water, soil, and foods. (*b*) The principles of warming and ventilation. (*c*) Meterorological instruments and their use.

(2) Practical pathology, parasitology, and microscopy. (*a*) Practical bacteriology, including bacteriological analysis of air, water, foods, and soils. Disinfection and sterilization. Isolation and identification of pathogenic bacteria. (*b*) Recognition of animal parasites. Life-history of some of the most important animal parasites. (*c*) Morbid anatomy of lesions associated with parasitic diseases (characters of diseased meat). (*d*) Microscopical impurities of foods, air, and water.

(3) Comparative pathology of domesticated animals. Pathology of epizootic diseases and of diseases due to unwholesome food, air, water. Influence of housing, climate, season, soil. Geographical distribution of diseases. Artificial and natural immunity. Effects of heredity on liability to disease.

(4) Veterinary hygiene. Construction of stables, byres, pigsties, kennels, &c. Hospitals, abattoirs. Methods of ventilation, drainage, disposal of refuse. Foods. Water supply. Methods of transport.

(5) Sanitary law and administration. Control of contagious diseases under the provisions of the Contagious Diseases of Animals Act. Statutes and by-laws.

(6) Inspection of meat, dairies, cowsheds, farms, &c. Sanitary reporting.

In the conduct of the examination the University has had the assistance of the highest authorities in the kingdom, viz., of Sir John MacFadyean and Sir Stewart Stockman.

That the institution of a post-graduate course in veterinary State medicine has met a want is shown by the fact that a number of men of high standing have taken advantage of the opportunities offered by the University, but the most convincing proof of the need which veterinary surgeons wishing to enter public service have of special post-graduate instruction has been given by the Royal College of Veterinary Surgeons, who have quite recently instituted a Diploma in Veterinary State Medicine* on lines similar to those which have been described above.

AIR-OXYGEN IN MILK FEVER.

By C. P. HYNES. M.R.C.V.S.
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I, too, have read with much interest Mr. G. Mayall's article on "Milk Fever," especially his remarks on those cases which do not oblige us by running a rule-of-thumb course.

I have recently come across some of these instances, and one peculiar case was ushered in by violent shivering, the animal fighting gamely to keep her legs. While attempting to inject the udder she went down, and the treatment was completed in the prone position. This case responded to the treatment in the ordinary way, going on fairly well for a day or two, but then developed a "blow," with a temperature of 106° F., which persisted, in spite of febrifuge treatment, for more than a fortnight, accompanied by weakness of the hind limbs, loss of appetite, and disordered bowels. A second udder injection was tried without appreciable result; however, the cow eventually made a complete, though slow, recovery. I do not see anything very novel in Mr. Patrick MacCormack's treatment, as outlined in your last issue. It seems to me to be a bit of "the same again," and with the editor's somewhat restrained remarks thereon, 'nuff said. I think, how-

* The term "Veterinary State Medicine" was adopted by the University of Manchester, to indicate the fact that the object which the University had in view was the preparation of men for State and other Public Services in which a knowledge of Veterinary Medicine was of importance.

ever, that the editor's allusion to the simplicity of the air treatment and its ease of imitation by the observant layman deserves more than passing notice. The idea of self-preservation should be always with us, and no matter how we disguise this successful treatment, either by pumping the air through a bit of cotton-wool or other elaborate "contraption," it (the idea, not the air) eventually leaks into the mind of the owner or onlooker that your charm is "wind" from beginning to end, and "wind" alone.

Unless some efficient attempt is made to envelop the bicycle-pump procedure in unfamiliar trappings, we have only ourselves to blame if one fine day we read in every small town veterinary chemist's window an advertisement of "The great home cure for milk fever. Buy our wonder-working outfit. You work the ball and we do the rest," and exit Mr. Veterinary Surgeon from the realms of this disease. Mr. Mayall mentions that most of the "dopes" injected depend for success on their oxygen-producing properties, and admitting this premise as correct, I am tempted to give details of a simple oxygen-air treatment which has given me invariably satisfactory results, and at the same time clothed the air treatment in a more unaccustomed garb.

Granted the cow is down, which is generally the case, I have her turned over flat on her side, putting a good man to hold her head down.

With a rope the uppermost hind leg is tied well back to some convenient and solid object, the udder quickly stripped and the teats washed—the teats only, as I do not see the necessity of a general laundering of the organ. In the meantime the syringe (a plain rubber milk-fever syringe and syphon) is sterilized by boiling, and it is a good plan to let the instrument fill itself with water before dropping in to boil. A quart or so of a good claret-coloured solution of permanganate of potash in boiling water is now prepared—about what goes on a two-shilling piece to the quart will give a suitable solution—but if in these bad times the practitioner is not sufficiently affluent to take liberties with a florin, then a bronze coin—to wit, a penny may with safety be substituted. The crystals are carried in an ordinary ounce bottle, and conspicuously displayed thereon is a single poison label in red. This I find begets the wholesome respect of the inquisitive, and furnishes the imaginative practitioner with a fine opportunity

of giving an old dog a new name. If the solution is poured from jug to jug to cool or to help solubility, and the fine rich colour of the "pizin" is noted and inquired after—well, the I. P. gets another chance.

Out of a cup held by an assistant two or three pumpfuls of this solution is injected, beginning with the lower hindmost teat. The syringe is then withdrawn from the mixture, and instructions given that the valve end be held close over the same. Inflation then begins. Pump away till the quarter becomes well distended, at the same time observing that the syringe end is held close to the bath, snuffling, as it were, but not sucking up or pumping in any more of the solution. I hold that the udder gets purified air by this procedure mixed with a certain amount of oxygen, which we all know permanganate of potash in solution is so ready to give off.

Tapes or tyings are not used, but as the syringe is withdrawn the teat is grasped so as to imprison the oxygenated air for the time being. The quarter then gets a little massage, the teat is impinged upon itself sundry times, as Mr Mayall described, and the operation is finished, except for the remaining quarters, which are set about in a similar way. Superfluous gas certainly does immediately escape, but it does not seem to matter, as there is no doubt, from the results obtained, that more than enough remains. The cow is now released, trussed up on her sternum with bags of straw and well clothed with warm, dry covering.

Since adopting this air-oxygen treatment I have had very rapid recoveries and no bad udders. I am certain, too, that the owner is more impressed, less likely to copy, and "parts" more cheerfully than if the plain unvarnished atmosphere we breathe were summarily pumped in without attempt at concealment, and I flatter myself that the game is being played to the profession as far as speculating in futures goes. A hypodermic of cardiac stimulant (I also use P. D. and Co.'s cardiac tonic tab.) is certainly indicated in advanced or deeply comatose cases, where the body surface is cold and the temperature subnormal, but warm, heavy, dry coverings heated before the fire also play an important part here. I find that the stomach and bowel functions run all fours with the rapid recovery, and assert themselves quite time enough to obviate the necessity of that delightful operation known as "back-raking," which to my mind savours strongly of the Empirical Ante-Schmidt Generation, when something had to be done to show the practitioner's energy and anxiety to ward off the inevitable dissolution.

Abstracts.

BOVINE TUBERCULOSIS IN MAN.*

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AND
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THERE never was a time when it was so necessary to take stock of the nation's living possessions; never a time when it was so essential as it is now to raise healthy strains both of man and beast. Tuberculosis continues to contaminate these strains. It is true that the amount of contamination is decreasing, but there still remains an enormous task to be accomplished before either physician or veterinary surgeon, farmer or social economist can rest on their oars. For the past three years a campaign against tuberculosis has been actively waged all over the country. Curative measures, measures directed towards the alleviation of human beings already affected have been most in the public mind. Curative methods there must be: the tuberculous worker must, if possible, and as soon as possible, again assume a position of economic independence. It is not the business of this paper to discuss these methods but to bring forward the evidence of many investigators upon the important position in the whole problem of bovine tuberculosis in man. No number of beds in sanatoria and hospitals will ever suffice to stamp out tuberculosis in human beings unless the sources of infection are attacked. It is not in dispute that there are two main types of the tubercle bacillus—the human and bovine. What was in dispute for some time was whether the bovine bacillus could cause disease in man.

Koch at the International Congress on Tuberculosis in 1901 startled the scientific world. He asserted that man was practically never infected by bovine tuberculosis. Subsequent research has shown that this statement is erroneous.

Koch, of course, realized that to show that cattle or pigs

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* This paper was first published in *The Reading University College Review*, vol. v, No. 15. August, 1913.

October 11, 1915.—Since its first issue much new work has been carried out on the subject with which it deals. It has therefore been revised and brought up to date as it is felt that the subject matter is of urgent interest at the present crisis.

Note.—Tuberculosis as it affects man is divided into (*a*) pulmonary tuberculosis, that is to say, tuberculosis of the lungs, "consumption," or "phthisis," and (*b*) "other forms of tuberculosis," that is to say, tuberculosis affecting any other part of the body but the lungs.

were not susceptible to human tuberculosis was no proof that the reverse may not occur; he therefore proceeded to discuss the evidence for human infection by cattle. As no direct experiments could be carried out he discussed indirect evidence. "It is well known that the milk and butter consumed in great cities very often contain large quantities of the bacilli of bovine tuberculosis, and unintentionally carry out the experiment which we are not at liberty to make. If the bacilli of bovine tuberculosis were able to infect human beings, many cases of tuberculosis caused by consumption of alimenta containing tubercle bacilli could not but occur among the inhabitants of great cities, especially in children. And most medical men believe that this is actually the case. In reality, however, it is not so. That a case of tuberculosis has been caused by alimenta can be assumed with certainty only when the intestine suffers first, *i.e.*, when a so-called primary tuberculosis of the intestine is found. But such cases are extremely rare." Professor Koch then cited statistics; he said that he himself had only seen primary tuberculosis of the intestine on two occasions, that Biedert had only found it sixteen times among 3,104 *post-mortems* of tuberculous children. "Primary tuberculosis of the intestine, especially among children, is a comparatively rare disease, and of those few cases that have been enumerated, it is by no means certain they were due to infection by bovine tuberculosis, it is just as likely that they were caused by the widely propagated bacilli of human tuberculosis." That then was Professor Koch's position—that cattle could not be infected by tubercle bacilli of human origin, and that since primary tuberculosis of the intestine in man was extremely rare, it was very improbable that man, considering his many opportunities of infection, was liable to bovine tuberculosis.

It may be said at once that the statistics quoted by Professor Koch concerning the frequency of primary tuberculosis in children do not correspond with those obtained in this country. Woodhead, Shennan, Guthrie, Still, Ashby, and Carr have published the results of the *post-mortem* examinations of 1,161 tuberculous children; primary intestinal tuberculosis was found in 286 = 20·30 per cent.

Those who listened to Professor Koch realized the gravity of his statements. Professor Nocard pointed out that M. Chauveau

had infected cattle with tuberculosis from human sources. He stated that the results of such inoculation varied very much: "In certain cases one succeeds and in more frequent cases one does not succeed." He thought failure was due to the transference of the organism from a favourable to an unfavourable soil. He also showed that there were numerous well-authenticated instances in which human beings, especially veterinary surgeons, had been "inoculated while making *post-mortem* examinations on tuberculous cows." "Then the disease has remained unnoticed for several months, but it has revealed itself sooner or later; its course has varied according to different circumstances, but it has finally appeared. Some of them have been cured; we have a colleague, also a veterinary surgeon in Copenhagen, who is an example of its curability. Others are dead, having watched step by step the progress of the disease from the moment of inoculation to the summit of the corresponding lung." Porfessor Bang pointed out that although "there is little danger of infecting cattle from tuberculous men it is not always certain that the opposite conclusion is right." "I fear Professor Koch has gone a little too far when he speaks of the non-necessity of taking measures against the tuberculosis of cattle. I fear his opinion will be rather detrimental to the work which goes on in many countries in order to procure healthy milk for the public." There is no doubt that Professor Bang was right, and that Professor Koch's statement has retarded by many years measures for the improvement of the milk supply of this country.

Professor Sims Woodhead pointed out that Crookshank had been successful in producing tuberculosis in a calf, using the sputum of a tuberculous patient. He very wisely added that the matter was of very great importance, and "we cannot settle it by talking about it; it is only by careful experiments carried out on very definite lines that we can convince ourselves of the accuracy or insufficiency of Professor Koch's statements." He further suggested that a commission should be formed to investigate the matter. In the last fourteen years a large body of evidence has been accumulated which seems to prove that a certain proportion of tuberculosis in man is due to the bovine type of bacillus. This evidence may be divided up into two main groups, (*a*) experimental, (*b*) statistical. The experimental

evidence must clearly be of two sorts: first, the proof or disproof that tuberculous material from human beings can infect cattle; and, second, that man can be infected with tubercle bacilli of the bovine type.

The Royal Commission in their Report of 1907 stated that they had studied the nature of the tuberculous material obtained from sixty cases of the disease in man. They found that the organisms obtained divided themselves into two main groups. Group I comprised fourteen strains out of the whole number which were capable of producing generalized tuberculosis in calves and rabbits. Group II consisted of forty cases; these produced a more or less localized lesion—never a generalized tuberculosis either in calves or rabbits. The remaining six cases showed characteristics which made it impossible to include them in either of the two main groups. The conclusion seems inevitable that both man and cattle may be infected by the same organism. If this conclusion be true it is necessary to consider the route by which the bovine type of bacillus penetrates man and the material in which it comes. The answer to the first question is to be found in the work of many people, thus in the Report of the Royal Commission on Tuberculosis it is stated that the tuberculous material of Group I was supplied to the Royal Commission in the form of glands from the abdomen or neck; and when the details of the several cases were studied it seemed that the bacillus found an entrance into the body by way of the alimentary canal; now the spread of tuberculosis from man to man is generally held to take place mainly through the respiratory passages, but very different are the conditions determining the entrance into the human body of bacilli coming from a bovine source. The opportunities for the transmission to the body by the respiratory passages of the air-borne bacilli coming from the lungs of a tuberculous cow are insignificant compared with the abundant opportunities for the transmission to man of tubercle bacilli present in cow's milk. That infection of distant tissues may occur through the intestinal tract is seen continually in typhoid fever, in which disease the organisms taken with the food or drink may be found circulating in the blood during the first week of the disease. Calmette and Guerin, Calmette and Petit have conducted many experiments which show that infection through the intestinal tract may readily occur, and

that organisms introduced into the intestinal canal may be found circulating in the blood within six hours of their introduction. It must be admitted that infection through the intestinal tract is by no means an impossible occurrence.

Later research has shown that in considering the intestinal tract, we must consider rather the whole alimentary tract, including teeth and tonsils.

Stiles, in a valuable paper read before the National Association for the Prevention of Consumption at Leeds in 1914, stated that "the human bacillus is inspired: the bovine bacillus is ingested. Both have access to the tonsils. In swallowing tuberculous milk the bacilli are squeezed into the little pockets of the tonsils, where they multiply and then pass to the upper glands of the neck." Mitchell examined the tonsils from seventy-two such cervical glandular cases. In 37 per cent. the tonsils showed evidence of tuberculosis under the microscope. In twelve cases he isolated the bovine bacillus; in three the human bacillus. There is, therefore, good evidence to show that if the tubercle bacillus be brought in contact with the alimentary tract it can penetrate the human system and produce disease. There is only one material that passes from the cow to man in such a form and in sufficient quantity to be able to produce an appreciable amount of chronic disease. That material is uncooked milk of which we in this country probably drink more than almost any other nation in Europe. Is there any evidence that there are sufficient tuberculous organisms in milk to give rise to a constant stream of cases of bovine tuberculosis. The following table gives the figures obtained in some of the large towns:—

TUBERCLE BACILLI IN MIXED MILK SAMPLES (PERCENTAGES). (Savage).

	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910
Manchester	8·7	8·57	10·42	6·7	6·15	6·2	5·74	8·28	5·14	—
Liverpool, country samples	6·1	7·3	5·1	9·2	3·8	6·8	4·7	3·3	1·8	4·1
Liverpool, town samples	0·6	0·4	0·8	1·5	0·4	1·4	1·5	2·0	—	1·4
Sheffield, country samples	—	17·8	16·7	6·7	14·7	9·6	9·7	9·9	10·9	10·4
Birmingham, country samples	Prior to 1908 = 14 per cent.							11·3	7·5	7·3
Leeds, country samples	—	—	—	—	—	—	—	25·3	16·4	—
Sunderland	—	—	—	—	—	—	2·5	7·0	7·4	3·6
London (L.C.C.) ...	—	—	—	—	—	—	—	11·6	10·4	—

If an average be taken of these with other large towns between 9 per cent, and 10 per cent. of the mixed milks are found to contain tubercle bacilli. In places in which there is inadequate veterinary inspection the proportion of infected samples is very much higher.

Thus Mitchell found that in Edinburgh 20 per cent. of the samples taken from milk on sale at the milk-shops contained living tubercle bacilli, and Stiles in his paper stated "most emphatically, that in Scotland 75 per cent. of the surgical tuberculosis is due to infected milk." Earlier in the paper he mentioned that 50 per cent. of his cases in the Edinburgh Children's Hospital were cases of surgical tuberculosis. Stiles based his estimate of the percentage of bovine tuberculosis upon the careful investigations by Fraser and Mitchell of the material derived from cases upon which he himself operated. There is no doubt the milk of this country does contain living tubercle bacilli. To what extent does infection take place? The answer to this question should be twofold: first, the demonstration of the bovine type of bacillus in tuberculous material derived from sick persons; and second, if the source of the infection be milk that those who drink most milk are the worst sufferers.

The work of Park, Krumwiede, Fraser, Mitchell, Eastwood, F. Griffith, and A. Stanley Griffith shows that man can be infected by the bovine type of bacillus, and that the most intense infection is amongst the chief milk drinkers.

A. Stanley Griffith examined material from thirty-five unselected tuberculous cases occurring in children between 0 and 12 years and found six bovine infections, twenty-eight human, and one mixed infection. It is interesting to note that all the cases of bovine infection occurred in children between 1 and 4 years, *i.e.*, at the period when cow's milk forms the chief diet.

Eastwood and F. Griffith investigated this question from another point of view. They obtained *post-mortem material* from institutions within the county of London from 150 children dying from all causes between the ages of 2 and 10 years. Ninety-four showed evidence of infection with tubercle bacilli, and from seventy-eight of these cultures were obtained. It is important to note that in five of these cases *cultures were obtained*, though no demonstrable lesions of tuberculosis were found. In sixty-five of the cases evidence of infection with the human bacillus was obtained: fifty-two of these infections had proved fatal ones.

In thirteen of the cases evidence of infection with the bovine bacillus was obtained: nine of these had proved fatal to the children.

The investigations quoted all tend to show:—

(1) That a definite proportion of tuberculosis in man is due to the bovine type of bacillus, that this proportion is highest in the young (0-5), not quite so high but still very appreciable in those from 5-16. From this age period upwards it becomes a constantly diminishing factor (Park and Krumwiede).

(2) That in some districts at least the proportion of bovine infection in certain types of tuberculous disease in children is very high, thus Fraser, working in Edinburgh, found the bovine type in 58 per cent. of the cases of tuberculous disease of the bones and joints which he investigated. Mitchell, also working in Edinburgh, found it in 90 per cent. of the cases of tuberculous infection of the glands of the neck.

(3) That in other districts the proportion does not appear to be so high. Thus Eastwood and Griffith from seventy-eight cases obtained from institutions within the county of London found 16·7 per cent. to be due to bovine infection. Stanley Griffith—the source of the material is not stated—found 17·6 per cent. of bovine infection.

The persons, then, who show bovine infection are those who drink most milk. Is it possible to show that partly as the result of measures to insure a much less infective milk supply the death-rate from tuberculous disease other than pulmonary is falling more rapidly than the death-rate from pulmonary tuberculosis? Let us consider some of the figures. Sir George Newman, Chief Medical Officer of the Board of Education, gives in his Report for 1914 a valuable table compiled by Dr. T. H. C. Stevenson. This table shows the mortality in England and Wales from all causes and from tuberculous diseases during the period 1907-14. If we take the figures for 1914 as equivalent to 100 the following facts emerge:—

DEATH-RATE PER 1,000 LIVING.

	1907	1914
1.—*At all ages*—		
(*a*) All causes	107·5 ...	100
(*b*) Other tuberculous diseases ...	127·7 ...	100
(*c*) Phthisis	132 ...	100
2.—*Ages* 1-5—		
(*a*) All causes	125·6 ...	100
(*b*) Other tuberculous diseases ..	127 ...	100

From this we may conclude that the diminution of the death-rate *at all ages* from those forms of tuberculous disease chiefly produced by milk has not been quite so great within the years under consideration as the diminution in the death-rate at all ages from tuberculous disease of the lungs. If we take the period 1-5 it is seen that the fall in the death-rate from all causes has not been quite so great as the fall from "other tuberculous diseases." These figures apply to England and Wales. Can it be shown that in a community where active precautions are taken to supervise the milk supply better results have been obtained?

For many years the milk supply of Manchester has been very carefully controlled, and the percentage of mixed milks showing tubercle bacilli has been reduced from 17·2 per cent. in 1897-8 to 5·14 per cent. in 1909. Professor Delépine, who is responsible for the work, has published figures to show that the death-rate from tuberculous diseases other than pulmonary tuberculosis has diminished in Manchester at a greater rate than that for all other causes and for pulmonary tuberculosis. He assumes that the improvements in general sanitation, &c., affect the general death-rate, and the death-rate from pulmonary tuberculosis, as much as they affect the death-rate from other tuberculous diseases, and that if he can show that the reduction in the mortality from tuberculous diseases other than phthisis is proportionally greater than the reduction in the mortality from phthisis, and from all causes, it is reasonable to claim that this result is in all probability due to improvement in the milk, and the amount of that improvement may be taken as a basis for an approximate estimate of the share taken by bovine tuberculosis in the infection of human beings. Some of Professor Delépine's figures are summarized in the following tables, in which the average death-rate for 1906-10 is called 100, the death-rates at the other five-year periods are expressed in terms of this figure.

MANCHESTER (ALL AGES).

Deaths	All causes	Phthisis	Other tuberculous diseases
1881-1885	133 ...	146 ...	156
1886-1890	136 ...	106 ...	161
1891-1895	133 ...	126 ...	164
1896-1900	128 ...	123 ...	139
1901-1905	113 ...	117 ...	120
1906-1910	100 ...	100 ...	100

From these figures it would appear that there has been a greater saving of life in other tuberculous diseases than is the case in either of the other two groups; it also shows that whereas the deaths from other tuberculous diseases increased in number from 1881 to 1895, there has been a steady diminution in the last fifteen years; in fact, just at that period when the active measures taken against infection might be expected to produce some effect. If we examine the statistics for the age period 0-5, it is found that there is again a greater fall in the death-rate from other tuberculous diseases than from all causes; at this age period the deaths from pulmonary tuberculosis constitute so small a fraction of the whole as not to be comparable.

MANCHESTER (AGES 0-5).

Deaths	All causes	Tuberculous diseases other than pulmonary tuberculosis
1881-1890	163	193
1891-1895	143	198
1896-1900	144	161
1901-1905	120	127
1906-1910	100	100

These statistics seem to show that where a genuine effort has been made to deal with the problem of tuberculous milk, there a definite gain is effected; they must not, however, be too literally accepted, for, apart from other outside influences, the same difficulty arises that is present in the consideration of the returns of the Registrar-General, that we do not know what proportion of deaths from other tuberculous diseases is due to the bovine type of bacillus and what to the human. On the evidence at present available from one quarter to one-third is bovine. If we take it at the lowest estimate, we find that the bovine type of tubercle bacillus is the cause of about one-fourth of the cases of other tuberculous diseases at ages 0-16; that is to say, about 3,000 deaths a year. It is usually supposed that for every death there are at least ten persons suffering from the disease. If this be so bovine tuberculosis is responsible for 30,000 cases of illness at any one time. What this may represent in monetary loss it is impossible to estimate accurately, but it will be well within the mark to say not less than £300,000 per annum. What it represents in pain and suffering and ultimate loss of earning capacity only those who have to deal with the disease can realize.

SUTURES AND SUTURING.*

By J. V. LACROIX.
Kansas City, Mo.

For the purpose of joining tissues wherein there has been effected solution of continuity, sutures of some kind have long been employed to procure prompt coaptation of wound margins. The term "suture" is applicable to material employed in the process of joining tissue as well as to the joined structures after coaptation has been effected; consequently, in one sense, there is no great difference in the significance of the terms "sutures" and "suture materials." We shall limit our consideration of suture materials to those commonly employed.

Suture materials are of vegetable, animal and metallic origin. Of vegetable origin we have linen thread put up for use in various ways, and this constitutes a very strong and durable agent that is particularly serviceable in uniting surface wounds in thick-skinned animals. Linen thread is very effective when employed as a ligature for bulky masses of tissue, but it becomes very dense after having been *in situ* for a few hours and is quite prone to cut through tissue encompassed when tension is great. However, it is a very serviceable material for emergency work upon the large animals and does not become absorbed even when buried in the tissues. For the purpose of reinforcing marginal sutures, linen tape is very useful, since because of its shape, it does not readily cause pressure necrosis under tension.

Of animal origin, the materials usually employed are gut, kangaroo tendon and silk. Gut is very frequently employed and when not treated in any one of the numerous ways to retard its absorption, will become absorbed in a few hours. The time required for its absorption depends upon the character of the tissues containing it and the size of the suture material. Tissue that is vascular and that tends to keep sutures in a moist state, will absorb sutures earlier than will tissue that is not so well supplied with vessels. When it is desirable to have a gut suture remain in position for several days, it is treated by being chromicized, or iodinized, or otherwise rendered more dense. Used in the approximation of some sub-surface wound margins, it is very dependable.

* Presented at the meeting of the A.V.M.A. Section on Practice, Oakland, Cal.

Where there exists material retraction of heavy muscular or tendinous structures attending accidental or intentional division of same, heavier suture materials are employed for effecting coaptation of the retracted margins or ends. For this purpose kangaroo tendon or other prepared fibrous animal tissue is used. However, in the use of buried sutures, due rgard must be given the vascularity and bulk of tissue sutured and the amount and size of the material employed. Where tissue is vascular and tension is great, necessarily strong sutures are required. Buried gut sutures may be so inserted that because of unequal distribution of tension anæmic necrosis caused by pressure is the result. Likewise an excessive amount of suture material will produce a similar effect.

Silk suture material, because of its strength and soft texture, constitutes a valuable agent for almost any case where suturing is indicated. For intestinal work or fixation operations where there exists malposition of viscera of small animals, silk is very useful. For the reduction of certain herniæ in the large animals, heavy braided or twisted silk suture material is often employed. Silk sutures may be buried when used for approximation of subsurface tissue, and the superficial structures can be brought together with a separate suture, and there results little or no disturbance because of the presence of this buried material if sterile.

Metallic suture materials usually employed are silver and copper wire. We shall not here consider steel in any form, nor aluminum or gold plates, which are serviceable in bone surgery. For the purpose of approximating margins of cartilage when wounded, metallic sutures are very serviceable; many veterinarians employ wire for the closure of abdominal wounds of small animals in order to insure their being left *in situ* should the subject be inclined to molest the wound. In certain fractures of the jaw in the horse, copper wise may be employed to good advantage; it may be wound around the base of teeth, thereby immobilizing the affected parts.

In addition to affecting approximation of tissues that have been divided, sutures are useful in many instances in that they are the means of joining the margins of the skin where wounds have been inflicted, and in this manner there is made use of a natural protection for the underlying tissues, which would otherwise need to be protected by means of dressing material of some sort.

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To render possible primary union of tissue, perfect apposition of wound margins with complete immobilization of the structures in the immediate vicinity is esssential, and the use of some kind of suture material is necessary. While in some instances it is possible to bring about this result by the use of bandages or other appliances, such measures in veterinary surgery are applicable only in wounds of the extremities.

For the purpose of accomplishing prompt healing of wounds and lessening the amount of granulation, sutures are of service even though perfect coaptation of wound margins is not effected. It is possible to train toward the normal position with sutures tissues that have been divided in such manner that approximation of the divided portion is impossible, and the result of such suturing is very desirable in some instances. An example is the suturing of the divided portions of the extensor carpi-radialis where the distal portion has been detached from adjacent structures and considerably mutilated. In such cases by retaining in a suitable position the lower portion of the tendon for a week or ten days, the tissues are trained in such manner that excessive granulation with resulting unnecessary blemishes is avoided if subjects so affected are given proper after-care.

To make possible primary union of skin and fascia protecting the sub-surface from exposure and thereby obviating danger of exuberant granulation and in some instances suppuration, sutures which approximate the margins of the skin and fascial wounds with reinforcing sutures to prevent pressure necrosis and tearing out of the marginal sutures, constitute a very practical method of treating many wounds. Where fibrous growths are removed from horses' shoulders by means of approximation of the skin and fascia, primary union of same results, and complete recovery in from two to four weeks without exposure of the underlying tissues and without suppuration, is possible. Contrast this with a similar surgical wound that is left exposed to heal by granulation.

Recently the writer removed a fibrous mass from a horse's shoulder, and facilities were not at hand for the execution of a good technique from the standpoint of asepsis. The subject was not confined except with halter and twitch; the hair was clipped from the surgical area and the parts painted with tincture of iodine; a local anæsthetic of cocaine was used, and the fibrous

tissue was removed. An opening for drainage was made, the upper part of which was 2 in. below the lower commissure of the margins of the wound made for extirpation of the fibrous tissue; and the larger opening was firmly untied by means of a glover's suture. The cavity was packed with sterile gauze which was left in position for twenty-four hours. After-care consisted in cleansing the drainage wound daily to allow free discharge of wound secretions. The horse was kept on pillar reins for ten days. Primary union of the apposed wound margins occurred in this case, which proves that with ordinary care such results should be the rule and not the exception in general practice.

For the control of hæmorrhage by ligating vessels singly or by ligating *en masse*, some kind of suture material is necessary. In diminishing nutrition of the parts involved in degenerative changes, such as certain forms of goitre in dogs and in mammary tumours of sows, good results are accomplished by ligating the parts affected *en masse* with a material of linen or silk, whereas in some instances radical surgical removal would fail to bring about the desired effect.

For surgical purposes, suture material is sterilized and kept so while in suitable containers, and when employed by the veterinary surgeon under certain conditions, care and skill are necessary to prevent its contamination. It is a regrettable fact that among veterinarians comparatively little suturing of surgical or traumatic wounds is done in a manner to make possible wound repair with little or no suppuration. With hæmostasis and perfect coaptation and almost complete immobilization of surgically clean wound margins with provision for drainage where necessary, primary union of the contacting surfaces is the usual outcome. If tension upon sutures is not too great and where immobilization of wound margins is possible by means of reinforcing sutures of some kind, prompt and complete repair of wounds necessitating little or no after-care, is the result. The extra time and skill required in the execution of such technique is justified when after-care and results are considered.

For sub-surface coaptation of tissue, several rows or tiers of prepared gut when employed as continuous sutures are preferable to other means of suturing. With continuous sutures, a maximum degree of tension distribution is attained, and comparatively little time is consumed in suturing. However, the average

veterinarian habitually employs interrupted sutures in many instances where a continuous suture would be preferable. The use of a buried, continuous suture in laparotomies of small animals precludes all possibility of hernia, and where in some instances the buried suture prevents primary union of all of the surface margins, this causes no serious inconvenience to the subject.

There is no better example of the good effects to be derived by the proper employment of sutures or of the improper use of same than the contrast between the time required for complete recovery of a patient operated upon for the removal of a large shoe boil and so treated that primary union of the skin results in one case and healing by granulation takes place in the other.

An exposed granulating surgical wound is an exhibition of unskilful and barbarous methods practised by veterinarians, who should give some real thought and effort to the improvement of their way of treatment of wounds both surgical and traumatic so that their methods of handling may become more humane and more practical.—*Journal of the American Veterinary Medical Association.*

WARBLE-FLIES.

Protocols of Experiment.

The calf used for the experiment was born on September 28, thus excluding the chance of having been attacked by warble-flies.

Calf "A."

On December 1, twelve larvæ were extracted from the gullets of two steers. These were carefully removed so as to avoid injury. As each was extracted, it was placed between two folds of the gullet and kept in a warm place. The removal of the larvæ took about half an hour.

An incision was made in the right hind quarter of this calf, and the larvæ were dropped one by one into the pocket. The wound healed rapidly, and no traces of the larvæ were seen until February 2, when four warbles were discovered on the animal's back. All except one were on the right side. Two of these became absorbed later and two remained until after March 10, when they also gradually became absorbed.

Calf "B."

On January 25, twenty-six second-stage larvæ were secured as in the preceding experiment from four different gullets. They were placed in a pocket on the left hind-quarter of a November calf. On February 2 several warbles could be felt on this animal's back. One of them was squeezed out to make sure. Later, eleven of them pierced the skin all along the left side of the back. However, these died subsequently one by one and were absorbed; on March 10 only the punctures which they had made were visible, and all swelling had subsided.

The object of these experiments was mainly to find out if the second-stage larvæ taken from the œsophagus and thus interrupted in its life-cycle was capable of completing it in another animal. Experiments have been conducted by Koorevaar, who introduced larvæ beneath the skin of dogs and rabbits, and found them fourteen days later in various parts of the body, including the spinal canal and the walls of the gullet (quoted by Carpenter). Hence, Koorevaar concluded that the maggots reach the gullet, or spinal canal, after extensive wanderings through the tissues of the ox or calf, and that they do not travel to the gullet by way of the mouth. This theory appears to me to be the most likely, and the experiment with calf "A," given above, helps to support it. In this experiment the larvæ were not seen for a period of eight weeks, when four of them were noticed on the calf's back; and it is certain that they were, during this period, in some unknown part of the animal, possibly in the gullet (?).

In the case of calf "B" the larvæ were interrupted in their life-cycle at a later stage, and it may be that they were too far advanced to return to the gullet and not sufficiently mature to migrate to the back. For this reason they did not develop fully. It was noticeable, however, that in calf "A" two of the warbles were larger, and it looked for a time as though these larvæ would reach maturity.

In a recent article by Carpenter and Hewitt the authors quote Glaser, who states that the newly hatched larvæ he had under observation died in one and one-half hours if left in dry air, but that within an hour after hatching they could be revived by transference to water, in which they would live for two days. He concluded, therefore, that they need moisture for their further development, and that they would obtain this in the gullet.

Newly hatched larvæ, placed by him in the shaved skin of an experimental calf, made no attempt to bore through. One young maggot, however, hatched from an egg laid on his trousers by a female *Hypoderma lineatum* in June, bored through the skin of his own leg and disappeared in one and three-quarter hours, leaving a small round red spot visible externally. Four or five days later the larva could be felt through the skin, having grown to a length of 2·5 mm. Then it apparently worked its way upwards, for early in September swellings were apparent on the hip and abdomen, and at the end of that month a swelling at the lower end of the gullet was indicated by pain when swallowing. This moved quickly up the gullet, and, on October 2, Glaser had the satisfaction of extracting a warble maggot, 7·5 mm. long, from his own mouth.

"This involuntary experiment tends to show that a warble larva can bore through the skin of the leg and work its way into the gullet in the human subject, and that the insect might pursue the same course in the ox. As mentioned in the introduction to this paper, the experiments with muzzled calves tried during several years at Ballyhaise, show that animals, apparently unable to swallow either the eggs or the young larvæ of Hypoderma, are at the most but partially protected from infection. The strong mouth-hooks and piercer, and the well-developed spiny armature of the newly hatched maggot, suggest that it could, perhaps, bore as readily through the skin as through the mucous coat of the gullet, and we may eventually find the former to be, after all, the usual mode of entrance."

The quotation just given supports my own ideas on the subject that the newly hatched larvæ penetrate the unbroken skin. I have already shown that the egg is laid on the legs of the animal and attached to the base of a hair next the skin. This has been confirmed by Professor Carpenter. The parts where the eggs are deposited are not easy of access to a cow's tongue, and the hair covers the egg completely. Glaser mentions the fact that moisture is necessary to keep the larvæ alive; there are many opportunities for a cow to wet her legs during a summer's day, such as the dew in the morning, or when drinking; and the skin and hair would remain moist for a considerable period. In Glaser's experiment the larvæ were placed upon an area of shaven skin, but in Carpenter's abstract of his work no mention is made

about supplying moisture. Possibly the failure of the larvæ to bore into the shaven skin may be attributed to the lack of moisture. In any case an experiment such as Glaser describes places the parasites in somewhat abnormal surroundings.

Several reasons suggest themselves as to why the larvæ select the gullet in which to pass certain stages of their existence. The mucosa is only slightly vascular, and the reaction on the part of the animal against the parasites is inconsiderable. In other organs or tissues one frequently sees examples of encysted parasites, but I have not yet found an encysted warble larva in the gullet. One reason for this may be that the larvæ are constantly moving, and this fact may also account for their ability to pass through other tissues in their final journey to the back. It is noteworthy that nearly all helminths select either the abdominal cavity and respiratory tract or the skin for their habitat; for instance, *Gongylonema scutatum* is found in the walls of the gullet, strongyles in the lungs, bots in the stomach, &c. Possibly the presence of a freer supply of oxygen than could be obtained in the deep tissues may lead them to select these situations, though the food supply may also be an important factor in their choice.

The final position taken by the larvæ is in fibrous tissue, of somewhat the same nature as that found in the mucosa. The reaction of the body against them is manifested by œdematous swellings. Very probably this reaction would end in their destruction, since they have now taken up a fixed position. But shortly after reaching the back they bore through the skin, and bacteria gain entrance to the cavity in which they lie. Hence, it is my idea that they are helped rather than hindered in maintaining their position. In other words, the tissues have now two foes to cope with instead of one. In summing up, I think the reader will agree that the above experiment lends support to the theory of the larva penetrating the unbroken skin and thus gaining entrance to the body. This theory awaits final proof, and I am recording these observations merely for the purpose of adding my quota to the evidence already gathered.

The next point of interest concerns the position taken by the larva under the hide. While studying the structure of warbles I have noticed that the opening through the hide is oblique, and that the larva lies with its ventral surface upwards. The caudal

end is bent and protrudes through the opening, and this gives one the impression, from an outside view, that it is placed perpendicularly beneath the hide, instead of horizontally as is actually the case. Probably this has already been noticed by other observers, but the point I wish to make is that in the horizontal position the effect of the skin movements is reduced to a minimum.

The Time taken for the Emergence of Hypoderma lineatum from the Pupa.

Four larvæ found in stable on March 20, 1913, all emerged under sixteen days.

Three larvæ squeezed out on March 21, 1913, all emerged under fourteen days.

Five larvæ squeezed out on March 21, 1913, all emerged under nineteen days.

One larva found in stable on day of emergence, March 22, 1913, hatched in thirteen days.

These larvæ were kept in an incubator with intermittent heat up to 32° C. This shows how the temperature will influence the early or late appearance of warble-flies in the spring. A large number of larvæ were secured during the spring of 1913; nearly all were of *H. lineatum; H. bovis* only appeared later on. It was thought that during the spring of 1914 *H. lineatum* would be plentiful, but the contrary has proved to be the case; most of the larvæ secured so far are of *H. bovis*. Possibly the season may be responsible for this, as the early spring of 1913 was very wet. No specimens of *H. lineatum* were captured out of doors, but *H. bovis* was caught at a later date.—*From Report of Director-General for Canada.*

PITFALLS.

By L. A. MERILLAT.

A PITFALL is a pit covered over. Those who unconsciously tread over it fall into its depths unexpectedly. Literal pitfalls are shallow or deep. If deep the victim meets with disaster, if shallow the bystanders have a good laugh at his discomfiture. The figurative pitfalls met in a surgical practice are not unlike the literal ones. They are big and small, deep and shallow, ever in our path ready to trap the reckless, the careless, the inexperienced, causing havoc here and annoyance there according to their magnitude. To be ever on the look-out for pitfalls is no insignificant attribute in any walk of life; in surgery it is an essential quality, for the pitfalls are numerous, and often they are deep and dangerous.

The purpose of these paragraphs is to enumerate the circumstances and combinations of circumstances which constitute the most common pitfalls in veterinary practice, and especially veterinary surgery.

Pitfall No. 1.—A veterinarian is called to an establishment to examine a lame horse. Being an experienced practitioner and an able diagnostician of equine claudications, he makes a very systematic examination. He notices the horse knuckles on one hind leg as he backs from the stall. On walking off only the toe of the affected leg touches the floor. Trotted, the anterior stride is short, and there is a characteristic flip of the foot as it is lifted from the ground. After trotting about the lameness improves. He flexes the hock acutely for a minute, and finds that on trotting off again the lameness is more pronounced. Inspection and palpation of the hock reveal a slight enlargement at the antero-internal aspect. He learns that the animal has been showing signs of lameness in the morning for several weeks, improving with exercise and becoming lame again after rest. He diagnoses spavin and recommends firing. The diagnosis is right and the treatment is standard. The owner, however, is not inclined to submit his horse to such radical treatment—treatment that will blemish and that may not cure the lameness—and consequently withholds his consent momentarily to await developments. About two weeks later the patient is still lame, and on one particular morning is found pretty well disabled. He walks

on the tip of the toe, holds the lower joints rigid, and does not improve with work. Believing the horse to be getting worse from the spavin it is taken forthwith to the doctor to be fired. "He's getting worse, doc. I guess you'd better fire him," says the owner on turning over the horse to the attendant at the hospital door. The doctor, otherwise engaged, directs the patient to a stall to await his convenience. The attendant is directed to clip the hock preparatory to the firing when there is found time to do the job. Later in the day, without any further examination, the hock is fired and the patient turned over to the owner with directions for its care. Six days later (the horse still very lame) pus is found discharging from the heel, and on search for the cause a nail is found still impinged in the lateral lacuna of the frog.

This pitfall is not a warning to examine the foot of lame horses, as every experienced veterinarian does that, but it is a warning to surgeons to re-examine patients just before operating. Various accidents can befall patients between the time of examination and the time of operating, even though only a few hours have elapsed. If several days intervene, it is a very serious sin of omission to neglect the careful pre-operative physical examination of surgical patients.

Pitfall No. 2.—A large, well-fed, well-groomed and regularly worked draft horse in splendid condition of flesh is brought to the hospital affected with a sore back—a harness bruise. It is found hot, painful, œdematous, and with radiating lines extending down over the upper part of the ribs. The horse is affected with a subcutaneous abscess which might, as every veterinarian knows, attack the supraspinous ligament, and prove troublesome or even develop into a fistula of the withers. Being a good horse and in the hands of a sympathetic attendant, absolute rest and hot fomentations for four days are recommended pending the development of the abscess. At that time the patient is to return for the lancing. Having been annoyed for four days with the attempts to bathe the painful back, the horse so viciously opposes any handling of the affected region that it is thought advisable to secure him on the operating table. He fights the twitch, the belts, the hopples, and when turned down struggles incessantly while the abscess is washed, shaved, and evacuated. The whole body is bathed in perspiration and the breathing accelerated. On

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being returned to the standing position the gluteals are found to be hard, the hind legs collapsing, and the whole body trembling. He is affected with an acute attack of azoturia.

This accident, which occurs very frequently, is one of the greatest misfortunes that can befall a veterinarian. The explanation that the horse did not die from the operation is never accepted very gracefully, because the restraint was a part of the procedure, and the whole management (including the four days of rest recommended) was in the hands of the practitioner. Azoturia from surgical operations is excusable when horses a few days idle are brought some distance right to the operating table and then unfortunately develop the disease while they are under restraint. The surgeon under these circumstances may have no reason to suspect the patient is susceptible, but when the patient has been under treatment before the day of operating and no steps were taken to avert this accident the responsibility is ours. In operating upon horses in good condition—the kind that are susceptible to azoturia—it is always well to act carefully, to warn, to postpone, and to prepare against this unfortunate event.

Pitfall No. 3. Casting an Aged Horse.—Almost everyone knows about the dangers attending the casting of old horses for more or less painful and prolonged operations. Sometimes we are drawn into this trap almost unconsciously. A horse fifteen or sixteen years old is about to be fired for a spavin, ringbone, strained tendon, or some other condition. In clipping the field it is found the patient is ticklish, and is already putting up an opposition to the threatened interference with its comfort. After the field has been clipped and the twitch and the sideline have been safely and firmly adjusted and placed in proper hands, it is found that every touch of the iron is suddenly met with an acute wince, and when attempt is made to glide the heated instrument over the field the patient lunges about, in spite of every effort to control it. When the patient becomes heated into a profuse perspiration, fighting vigorously the restraint, as well as the firing, it is decided to complete the operation in the recumbent position. The very much excited patient now is cast and tied, probably with a hurriedly improvised apparatus. When the limb has been positioned and the firing resumed the patient continues to struggle, wiggle, strain, and fight incessantly. Sud-

denly a dull thud is heard; it is thought from the character of the sound that a tie rope has broken. The struggles are now less violent and confined to the fore part of the body; the hind extremities are limp. The knowing surgeon is now aware that the sound was something more than the breaking of a rope. The lumbar vertebræ have fractured.

This pitfall, while fortunately not so very common, does occur at least once in the lifetime of almost every veterinary surgeon. The victim is usually the young practitioner who has neglected to recognize the potential hazard that lies in the backbone of an aged spavined horse that is vigorous enough to put up a formidable fight against restraint.

Pitfall No. 4. *Casting with a Young Rickety Colt.*—A colt apparently in fair health, but affected with an invisible unmineralized condition of the skeleton, is cast for castration. The tying is not well done; the hind legs are too loose and push forward towards the elbows. Instead of stopping to rearrange the half-tied members the operator proceeds with the operation, thinking the tie is good enough for such a harmless creature. During the painful part of the procedure the hind legs are braced against the ropes, the back is roached, and in this curled-up position a severe struggling tenesmus ends with a dull breaking sound. When the operation is over and the patient has been with difficulty raised to the standing position a femur or tibia is found to be fractured. Often it is the separation of the diaphysis from one of the epiphyses of either of these long bones, at other times it is the fracture of the shaft. Either is serious, fatal. The prevention here is found in tying all patients well—tying them so that the legs are folded into a helpless flexion, instead of ever attempting even the simplest operation upon a half-secured subject.

Pitfall No. 5.—Without an assistant to protect the head against injury a horse is placed upon an operating table. The head is simply fixed to the table with the rope of a five-ring halter. The surgeon and his assistant are occupied with some other part of the body; the head is thought to be safely secured against injury. During the long-drawn-out preparation and performance of the operation, the body from the struggles is pushed forward tightly into the halter, the rings of which press hard and long against the temples. When the patient arises the upper lip is crooked,

drawn to one side, and the under lip is dangling at one corner, exposing the buccal mucous membrane. *The patient has facial paralysis.* The rings of the halter have bruised and probably permanently damaged one of the facial nerve trunks that surmount the inferior maxilla just below the temporo-maxillary articulation. This accident occurs in every degree of severity, from a transient paralysis lasting only a few hours (sleeping nerve) to a grave permanent impediment of the whole side of the face.

The prevention is found in the use of a round, soft rope halter placed always over, and never under, the padded hoodwink. Furthermore, the head of a horse secured on an operating-table should not be fixed with a rope. It should be held with a rope run through a slot in the table by an assistant who will " give and take " as the head moves about.

Pitfall No. 6.—An undersized horse or a colt is secured on an operating-table of standard size without making any changes in the belts and hopples. When turned down the feet barely reach to the hopples; the legs are stretched because the distance between the body-belts and the feet is too long for a horse of that size. On returning the subject to the upright position the fore-leg that was undermost collapses under the weight of the body; it cannot support weight. *The diagnosis is brachial paralysis.* One or more of the radicals of the brachial plexus were injured by stretching, as the weight of the body while struggling pulled heavily against the fixed foot. There are likewise different degrees of brachial paralysis. In long-drawn-out operations the leg may " fall asleep " from prolonged pressure of the plexus in horses of any size, but if there is no nervous injury the infirmity shown on arising is transient, passing off in a few minutes, or at least in half an hour. When this accident occurs in small horses and shows no sign of improving after some hours there is reason to be alarmed, because here some nerve has been more or less permanently injured. In some cases recovery occurs only after several weeks, and rare cases atrophy, and never entirely recover the full use of the leg.

Legs of small horses secured on the operating-table should never be fixed firmly at the feet. It is better to give the feet considerable freedom of movement at the hopple, so that lunges of the body do not stretch the legs. Furthermore, a second set

of hopple holes, placed closer to the belts, should be provided for small animals. These will be found useful in securing small horses, jacks, small mules, colts, and cows whose legs are too short for the appurtenances of the standard tables.

Pitfall No. 7. Overdosing with Cocaine.—It is decided to perform a bilateral plantar neurotomy in the standing position. Cocaine solution is selected as the local anæsthetic. A liberal amount of a 10 per cent. solution is injected subcutaneously over the four proposed seats of resection. The first and probably the first two nerves are resected, and the wounds sutured without untoward event, but when the third incision is made there is some opposition; the leg is jerked away from the assistant, probably two or three times in succession. The patient is sweating about the shoulders, the eyes are staring, the body trembling slightly, and the general appearance of the patient is that of nervousness. It will strike when the leg is picked up, it will shake the head against the torture of the twitch, and, in short, is fast being transformed from a once tractable subject to a veritable fighting fiend. Further attempt to complete the operation in the standing position is futile. The patient is poisoned with cocaine, and the drug is exerting an effect directly opposite to that for which it was given. It is producing hyperæsthesia instead of anæsthesia.

The remedy is more careful dosing with this poisonous drug. Four per cent. solution is strong enough if injected at the right place and delivered *en masse* instead of spreading it around over a large area. Furthermore, when four nerves must be resected, it is best to cocainize each seat just before the incision is made. The effect of properly delivered cocaine is almost instantaneous, and then by cutting down upon it immediately much less of the solution is absorbed.

Pitfall No. 8. Cutaneous Gangrene after firing Ringbones.—A horse affected with ringbone lameness, for want of a better treatment, is fired either with a pointed or edged iron. The hairy pastern is clipped, fired, and then blistered. Four days later there is more lameness, and the coronary region is swollen and very painful, and the patient is sick. Day after day the lameness is accentuated as the leg swells higher up. On the eighth or ninth day irregular patches of skin, some large and some small, are found to be dead, and crevices (lines of demar-

cation) are appearing around them, and pus is coming from every direction. Soon the patches slough off, and if the patient escape synovial complications and death from decubitus, the large granulating surfaces cicatrize very slowly into very unsightly horny scars. The patient either dies or is left permanently blemished after a long annoying convalescence.

The pasterns of horses are susceptible to necrobacillosis, and firing like any traumatism may become its exciting cause. Firing higher up never behaves in this manner. It is very evident, therefore, that firing of the pasterns should be preceded with a disinfection of the skin much the same as if a cutting operation is to be performed. In cities where necrobacillosis seems to be most prevalent in horse feet, firing of the pastern should be done only after the part has been washed copiously with soap and water, and then rinsed off with a strong solution of mercuric chloride. This done, sloughing will always be avoided. Severe firing (broiling the skin) may cause sloughing, but the sloughing therefrom is of a different order than that from necrobacillosis.—*American Journ. of Vet. Med.*

PREMIUM LIST OF GLASGOW STALLION SHOW.

THE premium list of the Glasgow Agricultural Society Stallion Show, which takes place at Scotstoun Show Ground on Wednesday and Thursday, March 1 and 2 next, has been issued. Premiums of £100 (terms £5 and £5) and £80 (terms £2 and £3) are offered for horses three years and upwards and two years respectively, to travel Glasgow district during 1917 season. The prize money in the two-year-old and yearling classes has this year been increased to the extent of £20. The selection of premium horses takes place on Wednesday, March 1, at 12 noon, and judging of open classes on Thursday, March 2, at 9.30 a.m. The following judges have agreed to act:—

Premium Classes.—Mr. William Brown, Craigton, Bishopton; Mr. Alex. Buchanan, Garscadden Mains, Bearsden; Mr. Alexander Murdoch, East Hallside, Newton.

Open Classes.—Mr. Charles Aitkenhead, Carr House, New Seaham; Mr. John Holmes, Glenshinnoch, Bishopton; Mr. John Wilson, Yett, Liberton, Carnwath.

Clinical Article.

SOME EXPERIENCES WITH MALLEIN IN CASES OF NASAL DISCHARGE.

By M.R.C.V.S. (TRANSPORT).

THE subjects were remounts purchased by the British Army in U.S.A., examined previous to purchase and declared free from contagious or infectious disease. They were railed down to the shipping wharves in cattle trucks, and many of them were sweating profusely and showing symptoms of catarrh on arrival. After drinking at a cold water trough they were put on board-ship at the rate of about 200 an hour. They all drank at the same trough and catarrh and pink-eye developed amongst them. I tested numerous horses with the mallein test, which had persistent nasal discharge with uncharacteristic lesions of the upper air-passages. None, however, reacted; but after a few days a visible diminution was noticed in the catarrhal flow and soon afterwards its complete disappearance followed. This did not arise from a simple coincidence of favourable circumstances, for in all cases, even the most obstinate ones which had withstood the usual remedial measures, the same favourable result took place. In doubtful cases I gave a second injection, timed as near as possible to within three days of the approximate date of landing, which was followed always by apparently complete recovery and cessation of nasal discharge entirely up to the time of landing, after which I lost sight of them.

Remarks.—From results it appears that mallein is effective against a non-specific nasal discharge. The mallein was injected subcutaneously and was obtained from the Royal Veterinary College. The ophthalmic mallein test was not used because cases of pink-eye were prevalent and it was considered that in many instances the ophthalmic test would not have been reliable. My remarks apply to horses and not mules. The vagaries of the reagent on the latter, judging from the report of such an experienced and well-known man as Mr. Scott, F.R.C.V.S., Bridgwater, are, to say the least, somewhat embarrassing and disconcerting, and a source of anxiety to veterinary surgeons engaged on transport work. American practitioners and those in charge of mules in the Army ought to have experience of mallein as it concerns the mule.

THE PRESENCE OF *DEMODEX FOLLICULORUM* IN THE HORSE.

By R. G. LINTON, M.R.C.V.S.
Professor of Hygiene, Royal (Dick) Veterinary College, Edinburgh.

Parasitic skin diseases of the horse are ever a source of annoyance, but when they appear among Army horses during a war, the state of annoyance quickly changes to one of serious gravity, causing, as they do, an immense amount of labour, with loss of public money and, we may imagine, military efficiency.

It is not surprising, therefore, that strict measures are adopted for the early diagnosing of mange, its isolation, and rigorous treatment; it is, however, curious to note that so little advance has been made in either our knowledge of equine skin diseases or of their treatment.

The presence of the *Demodex folliculorum* has been seldom observed, or if observed, seldom noted, in the horse. Neumann [1] states that the *Demodex folliculorum*, var. equi, has been found by E. Wilson in the Meibomian glands of the horse, and that in 1845 Gros found it in the horse's muzzle. Noël-Pillars [2] mentions that it has been found in the Meibomian glands of the horse, and that there it is of very little clinical importance. Nicolus [3] states that "varieties of the *Demodex folliculorum* are found in the glands of Meibomius and in other anatomical parts of the eyelids alone, or when other regions of the surface of the skin in the horse, ox, sheep, goat, pig, rabbit, marmot, dog, cat, or other species are also affected."

During the course of examination of some hundreds of mange scrapings and of horses "clinically" affected with mange, the writer has found the *Demodex folliculorum*, var. equi, on seven occasions located where, so far as he is aware, they have not previously been recorded, namely, on the withers and anterior part of the back. In each instance the demodex was found when the scrapings were personally made during a systematic search for elusive sarcopts; it has not been found in scrapings sent in for diagnosis, these, as a rule, being too superficial to contain the parasite. In no case was the demodex found by itself; it was in each case associated with the sarcopt. The number of parasites found was few, being two or three after extensive scraping, eight

being the largest number found on one horse during the search for the usual parasite.

It is not suggested that the *Demodex folliculorum* is only present in company with another parasite; the modern method of diagnosing parasitic skin diseases, and the only reliable one, that of boiling suspected material in liquor potassi and centrifuging, which was placed before the profession by Sheather, [4] will probably reveal on careful searching that the habitat of *Demodex folliculorum* is more widespread than is usually thought, and its occurrence probably frequent.

It is for the veterinary parasitologist to show if its presence is of any clinical importance.

REFERENCES.

[1] NEUMANN-MACQUEEN: "Parasites and Parasitic Diseases of the Domesticated Animals," p. 193.

[2] NOËL-PILLARS: "A System of Veterinary Medicine." E. Wallis Hoare, vol. ii, p. 1452.

[3] NICOLAS: *Ophthalmology*, p. 454. (In the Press: proof lent through the courtesy of the translator, Mr. Henry Gray, M.R.C.V.S.)

[4] SHEATHER: *Journal of Comparative Pathology*, vol. xxviii, part i, p. 64.

Translation.

ON THE SYMPTOMS OF ULCER OF THE ABOMASUM IN CATTLE.

By Dr. A. SALVISBERG.

Tavannes.

The diagnosis of ulcer of the abomasum in ruminants is not easy. The reason for this is on account of the extremely variable symptoms shown. No symptoms of illness and sudden death alternate with severe disease which necessitates slaughter, and again, a protracted illness may occur which continues for weeks and months. Such varying symptoms in a malady make recognition of the complaint difficult.

I am describing here four typical cases of ulcus ventriculi, which are of interest clinically, and in which the symptoms diverge very much.

Case 1.—On August 14, 1912, I was called to make a *post-mortem* on a cow one and a half years old which had been found dead on hill pasture, and was believed to have died of anthrax. The *post-mortem* showed none of the typical symptoms of anthrax, but there was exudative peritonitis and a perforation of the abomasum wall. I thought this perforation might be due to a trauma, having had many such cases where horses and cattle have been pastured together, as also rupture of the small and large intestines and spleen (all arising from horning or kicking). Always the mark of the blow from a horn or a kick could be detected. This was not so here, however. The abomasum was perforated at three places. They were little circular holes, as if made with a pointed iron. The mucosa of the abomasum was œdematous, and there were quite a large number of large and small ulcers covering its inner surface. The animal at the time of examination was in good condition, but some time previously, according to the owner, had suffered from coccidian diarrhœa, which may have been the cause of the ulcers. For the rest the animal had never been ill.

Case 2.—On November 30, 1913, I was called to a three and a half year old Simmentaler cow which had been suffering from diarrhæa for a few days. Appetite and rumination were in

abeyance. There was much general disturbance of health, temperature, pulse, and respirations all being increased, venous pulse, profuse diarrhæa. I told the owner it was enteritis, and entered in my journal "enteritis or ulcer of the abomasum." Several graduates state that hydrochloric acid is a certain diagnostic in ulcus ventriculi, and Hutyra and Marek, vol. ii, p. 332, state that a like reaction is produced in the case of an abscess due to a foreign body. This cow was given hydrochloric acid and tincture of opium. The reaction was typical. On the œdematous mucosa of the abomasum there were a large number of ulcers, deep, wide, and extensive, and quite distinct in form.

Case 3.—A heifer had suffered several weeks from diarrhœa. She was greatly emaciated and was slaughtered. *Post-mortem* showed slight œdematous state in the abomasum with enlargement of the plicæ spirales. There were true abomasal ulcers present. No worm nodules nor large erosions.

Case 4.—A ten-year-old pregnant cow had been well fed, kept getting thinner, but was not greatly emaciated. The administration of hydrochloric acid gave as prompt an effect as in the second case.

Summing up:—

Case 1.—A cow in very good condition, perforating ulcus ventriculi, peritonitis, death.

Case 2.—Well-nourished animal, sudden severe illness. Slaughter necessitated.

Case 3.—Advancing emaciation with continuous diarrhœa, very good appetite and ruminating.

Case 4.—Advancing emaciation for weeks, normal bodily functions, then sudden severe illness necessitating slaughter.

From many cases of ulcus ventriculi observed and noted by me, the most frequent train of symptoms met with correspond to those mentioned under heading III.—*Swiss Journal of Veterinary Medicine.* G. M.

War Note.

CARE OF HORSES ON BOARD SHIP.

STRICT attention to the following brief instructions is essential to success in care of horses on board ship:—

(1) *Rejection.*—Only healthy horses to be shipped. Rejection of any horse having a temperature over 102° or any other evidence of contagious disease is necessary.

(2) *Cleanliness.*—Mucking out must begin at once, and be continued throughout the voyage. Filth must not be allowed to accumulate anywhere.

(3) *Disinfection.*—Of first importance, as a routine measure and with special direction to standings, halters, hay nets and all fittings contaminated with discharges from infected animals.

(4) *Discipline.*—The veterinary officer must be energetic himself; there must be unremitting attention to, and supervision of, watering, feeding, mucking out, exercising, &c. The disciplined and energetic co-operation of all concerned is essential.

(5) *Removal of Sick Horses and Mules.*—The sooner a sick animal is detected and removed to an airy upper deck the better will be the chances of recovery and the less the spread of infection. The first principle in treatment of sick horses on board ship is the application of fresh air.

(6) *Treatment of Sick.*—Do not attempt to treat hopeless cases; it is contrary to hygienic principles and leads to infection of neighbouring horses. Avoid unnecessary drugging; prevention, hygiene, and active individual attention are far more efficacious than drugs on board ship.

(7) *Ventilation.*—Enlist the co-operation of the ship's officers in utilizing to the utmost every means of ventilation provided. Wind-sails, wind-scoops and the like need constant attention.

(8) *Septic Pneumonia.*—Every case of septic pneumonia occurring on board ship will be destroyed as soon as the odour of gangrene enables a definite diagnosis to be established. The carcase will be immediately thrown overboard and the stall and fittings thoroughly disinfected.

(9) *Pens versus Stalls.*—It is strongly recommended to travel

horses loose in pens formed by removing enough side bars to form pens for from five to ten horses, according to the construction of the ship. Vicious horses should be retained in stalls. Contrary to the prevalent idea horses carried loose in pens are less liable to falls, and consequent injury, than those in stalls.

(10) *Feeding, Watering, &c.*—Water as frequently and as freely as possible. Horses are extremely liable to colic and its complications, also heart failure from dietetic causes on board ship, and oats must be given sparingly. It is better to give no oats at all for the first three days. On the fourth and fifth days give 2 lb. of oats, on the sixth day 3 lb., and thereafter increase to, but on no account exceed, 4 lb. daily. Bran, damped and salted, and hay may be given freely throughout the voyage. Feed at least three times daily.

(11) *Exercise.*—This should be carried out wherever and whenever possible. Travelling horses in pens instead of stalls compensates greatly for lack of regular exercise.

(12) *Ship Staggers.*—A disease simulating epilepsy in man. Bring the animal under an open hatchway and douche the head with cold water. Whenever an animal is seen to be distressed bring it under a hatchway.

(13) *Foothold.*—Sprinkle ashes freely on platforms in rough weather and along alleyways whenever an animal has to be moved.—*Army Veterinary Department Leaflet.*

VETERINARY HOSPITAL SUGGESTED.

Mr. D. Cumming, Culter, Aberdeenshire, the President of the North of Scotland Veterinary Society, at a meeting of the Society in Aberdeen recently, said he was convinced that until they got the same conditions as the medical profession many valuable animals would be lost, not from want of proper treatment, but because the treatment was handicapped by the surroundings of the patient. What they had to strive for was a properly equipped veterinary hospital in a central position, where they could send their patients when their conditions were such that the attending surgeon could not do justice to himself or his patient.

Correspondence.

MILK FEVER IN COWS.

To the Editor of THE VETERINARY JOURNAL.

SIR,—I have read Mr. MacCormack's article and letter with interest. If all cows got up by the clock at the fourth hour there would be much sound argument in his observations. From my own experience, however, there is no guarantee of this and I think he will find, as years go on, that it may be six, eight, ten, twelve, twenty-four hours, nay, even longer, that cows lie before rising, and the removal of the tapes too early will not accelerate the getting up. As between pot. iodide and air the matter is not one of mystery, but of policy. If mystery entered into these matters then the effect of the subcutaneous injection of "cardiacs" must appear to the layman as almost a species of black magic. It is a good point made by Mr. MacCormack as to these injections and is worth bearing in mind, but it is not a miracle. The injection of air neither benefits us nor our pal the chemist. Neither of us can live on air alone, and when the farmer comes to pay his bill he may say, "Why the deuce should I pay for air; it is a free commodity anyway?" Personally, we still think the Danish method with pot. iodide better than the German air one, and we can give our reasons if asked. We may state that with pot. iodide we have never had a bad effect either on milk flow or the udder, but as we have written we always make our solution at home before starting and thus know that the mixture is made under good conditions. We have quite lately seen the subject of our recent article and she has been giving her usual supply of 3½ gallons a day quite regularly since.

Mr. MacCormack appears to think that complications in the ailment invariably fail if his treatment is carried out, but surely these incidents in any disease most frequently occur from matters over which we have little control and often from us being called in too late for the best and quickest results to be obtained. Milk fever cases vary in severity and complications in different years and regions. Various methods of feeding and dairy management in individual parts of these Isles cause some men to get more difficult and complicated cases than others. In 90 per cent. of instances here we cannot even get a decent loose box to put an ailing cow in. In his letter and article Mr. MacCormack was not writing as a pupil for professors and examiners but as a professional man for professional men, who quite know the importance of the right position for an ailing recumbent cow to be kept in. To have this carefully explained to them reminds me somewhat of that unprofitable operation known as "gilding the lily."

Yours truly,

G. MAYALL.

Reviews.

The Structure of the Fowl. By O. Charnock Bradley, M.D., D.Sc., M.R.C.V.S. Crown 8vo cloth, with 73 illustrations. Price 3s. 6d. net. Published by A. and C. Black, Ltd., 4, 5, and 6, Soho Square, London, W.

The veterinarian may at any time be asked to make a *post-mortem* on a dead fowl. Unless he is acquainted with the anatomy of the bird, the deductions he may make from his investigation will be liable to error. This book gives particulars of the naked-eye and microscopic anatomy of the domestic fowl. The study of the diseases of poultry will be made considerably easier after the knowledge which the author puts before his readers has been grasped. Much interesting information may be gained by a careful perusal of the work. Two out of many rays of light shed may be mentioned. Owing to the number of eggs laid in a bird's lifetime the abdomen is not large enough to accommodate eggs formed by two ovaries, consequently one ovary dwindles and disappears; there is no pelvic symphysis in poultry. If the pelvic bones were joined ventrally, their sufficient dilation for the passage of eggs would be impossible. There are thirteen chapters in the work dealing with the different organs and anatomical tissues. Perhaps the most welcome pages are those on the reproductive organs and the development of the chick.

There are many works by laymen on poultry, but the field has been consistently neglected by the veterinarian, and this is not to his credit. The Board of Agriculture is doing all it can to stimulate, what ought to be, the lucrative operation of poultry rearing. We spend about £9,000,000 a year on imported eggs. We want to give our country the benefit of some of this money. There is plenty of room for scientific books on poultry, and we heartily welcome this little volume as a commencement in filling a gap in our information which has too long been evident. As one of the manuals of the Edinburgh Medical Series, edited by Dr. John D. Comrie, the matter, printing, binding, and illustrations leave nothing to be desired. G. M.

Annual Report of the Camel Specialist for the year 1914-1915. Lahore. Printed by the Superintendent, Government Printing, Punjab, 1915.

The importance of the camel as a utility animal and beast of burden makes it desirable that veterinary knowledge of it should be disseminated. Mr. H. E. Cross, I.C.V.D., M.R.C.V.S., D.V.H., A.Sc., is doing important and valuable work in investigating the diseases of this quadruped. In some parts of our Dominions the camel will live where horses die like flies, consequently it is of economic and scientific weight that his care in health and disease should be understood. Mr. Cross calls atten-

tion to the prevalence of surra in the ruminant, and as a remedy seems to favour destruction and compensation in the case of diseased subjects. The author has made many interesting experiments in the medicinal treatment of camels. As purgatives, any of the following may be used: 8 oz. of kamala, four pints of linseed oil, 3½ dr. of croton oil, 3½ oz. of aloes, 1½ to 2 lb. of mag. sulph., 3 oz. of gamboge, and, hypodermically, 2 grm. of eserine, and 2 gr. of pilocarpine. Camels not castrated until they are 7 years old or upwards seem to do best. The diseases most prevalent among them were surra, pneumonia, colic, pus in the frontal sinuses, a form of influenza, and mange. Only five rupees are sanctioned for the purchase of drugs for each Grantee Camel Corps, and Mr. Cross calls attention to the inadequacy of this sum. There is also a lack of sheds to carry out investigation as to the susceptibility of camels to various infectious diseases, such as rinderpest, anthrax, and hæmorrhagic septicæmia. The work done by the camel specialist during the year is a tribute to his energy and acumen. He travelled 10,196 miles by rail and 1,637 miles by road, and carried out very many experiments and investigations of a praiseworthy description. Mr. H. E. Cross may be congratulated on original work in a unique field.

Tropical Veterinary Bulletin. Issued under the direction of the Honorary Managing Committee of the Tropical Diseases Bureau, Imperial Institute, S.W. Sold by Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden, W.C. Editor, A. L. Sheather, B.Sc., M.R.C.V.S. Price 3s. net.

The usual handy references to a wide variety of tropical diseases compose the fourth number of vol. iii of the *Tropical Veterinary Bulletin*. The periodical keeps well up to date in regard to the literature perused and commented on. Trypanosomiasis, leishmaniasis, protozoa, helminths, biting flies, rabies, and reports from veterinary officers of our Colonies furnish subject matter for annotation. Major Hobday's work on "Anæsthesia and Narcosis of Animals and Birds" is reviewed by Professor Macqueen. To students of tropical medicine the *Bulletin* must be invaluable. Some interesting points come out in the lines on "Some Observations on the Theory and Practice of Dipping," by W. F. Cooper and H. E. Laws. In the case of dipping with arsenic the drug gains access to the tissues of the tick by being imbibed not absorbed. The conclusion is also come to from the evidence that it is imbibed from the skin and not the blood, but in repeated dipping an animal accumulates arsenic in its skin up to a certain maximum, and the excess is absorbed by the blood-vessels and subsequently excreted. About 30 grm. of arsenic, or a full toxic dose orally, remain on the skin after one dipping.

XUM

ARMY VETERINARY SERVICE.

Temporary Captain J. W. F. Brittlebank to be temporary Major. To be temporary Lieutenants: A. J. S. Reynolds, P. Haugh.

Captains to be temporary Majors: W. J. Dale, W. H. Simpson. Temporary Lieutenant P. J. Austin to be temporary Captain. To be temporary Lieutenants: H. Quiggin, W. S. Walker.

The appointment of the following temporary Captains is antedated as follows: T. W. J. Gardiner to October 7, 1914; R. W. Simpson to October 13, 1914. The Christian names of temporary Lieutenant Alfred Edmund Davies Froggatt are as now described and not as stated in *Gazette* of January 5.

Temporary Lieutenant F. K. Henton to be temporary Captain. R. J. Bushnell to be temporary Lieutenant.

G. T. E. Anderson to be Lieutenant. H. W. Dawes to be Lieutenant.

L. G. Gryspeerdt to be temporary Lieutenant. F. T. Smyth to be temporary Lieutenant.

Temporary Lieutenant H. E. Whitmore to be temporary Captain. C. W. Finnemore to be temporary Lieutenant (substituted for notification in *Gazette* of June 17). To be temporary Lieutenants: D. M. Ireland, G. S. Walker, B. Philp.

Captain F. J. Taylor to temporary Major. T. M. C. Hunt to be Lieutenant. J. A. McLauchlan to be Lieutenant.

Temporary Lieutenants to be temporary Captains: B. H. Mellon, J. H. B. Martin, A. Whicher, J. MacBride, A. R. B. Richmond, H. B. Collet, G. G. Howard. To be temporary Lieutenants: A. D. Morgan, J. McC. Barry, W. J. Moran, W. A. Smith.

N. A. McG. MacEwan to be Lieutenant.

Temporary Lieutenant W. J. S. Foley relinquishes his commission.

Temporary Lieutenant W. W. Hindle to be temporary Captain. J. Connor to be temporary Lieutenant.

Lieutenant J. Crooks resigns commission. W. W. Scales to be Lieutenant.

To be temporary Lieutenants: J. D. Whitehead, F.R.C.V.S., C. B. Shemmonds, J. G. Taylor, W. C. H. Steele, S. J. Motton, F.R.C.V.S., W. Hill, J. B. Mackie.

Lieutenant (on probation) M. Glynn is confirmed in his rank.

J. A. MacLaughlan to be Lieutenant.

Captain C. A. Murray to be temporary Major whilst holding appointment of Commandant, School of Farriery.

To be temporary Lieutenants: H. J. Hughes, J. Bradley, H. A. King.

Temporary Lieutenants to be temporary Captains: J. M. Jamieson, G. K. Hobson, F. V. Perry.

Major J. J. Aitken to be temporary Lieutenant-Colonel. To be temporary Lieutenants: A. W. Campbell, S. T. Jackson, B. Wittam.